

IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Currently Amended): A process chamber cleaning method for cleaning a process chamber of contaminated with metal in a substrate processing apparatus for performing a vacuum process on a substrate, the method starting a cleaning process without setting the process chamber opened to the atmosphere after performing an oxidization process on a substrate including a film containing a metal inside the process chamber and thereby contaminating the process chamber with a metal oxide of the metal, and the method performing the cleaning process while exhausting gas from inside the process chamber such that the cleaning process comprises: comprising:

exhausting the process chamber while supplying a cleaning gas into the process chamber, the cleaning gas consisting of O₂ gas and H₂ gas and an inactive gas or consisting of O₂ gas and H₂ gas into the process chamber with a ratio of the H₂ gas relative to the O₂ gas set at 2 or more; and

generating plasma of the cleaning gas, thereby performing cleaning inside the process chamber, without setting the process chamber opened to the atmosphere after the process; applying the plasma to the metal oxide to sublimate the metal oxide; and removing the sublimated metal oxide thus generated from inside the process chamber along with gas being exhausted.

Claim 2 (Currently Amended): The process chamber cleaning method according to claim 1, wherein the metal is tungsten and process on the substrate is an oxidation process on a substrate containing tungsten the oxidization process is a selective oxidization process for selectively oxidizing a silicon film on the substrate.

Claims 3-4 (Canceled).

Claim 5 (Currently Amended): The process chamber cleaning method according to claim 1, wherein the oxidization process is performed while generating plasma of an oxidizing gas, and each of the plasma of the oxidizing gas and the plasma of the cleaning gas is on the substrate is a plasma process, and the plasma process and the cleaning are performed by plasma generated by microwaves supplied into the process chamber through a planar antenna having a plurality of slots.

Claims 6-9 (Canceled).

Claim 10 (Previously Presented): The process chamber cleaning method according to claim 1, wherein the cleaning gas has a ratio of H₂ gas relative to O₂ gas set at 4 or more.

Claim 11 (Currently Amended): The process chamber cleaning method according to claim 1, wherein the method further comprises heating the process chamber is heated by plasma before starting prior to the cleaning process.

Claim 12 (Canceled).

Claim 13 (Currently Amended): A process chamber cleaning method for cleaning a process chamber [[in]] of a substrate processing apparatus, the method starting a cleaning process without setting the process chamber opened to the atmosphere after [[for]] performing a plasma oxidization oxidation process on a substrate having a laminated film including a tungsten-containing film and a poly-silicon film to selectively oxidize the poly-

silicon film inside the process chamber and thereby contaminating the process chamber with tungsten oxide, and the method performing the cleaning process while exhausting gas from inside the process chamber such that the cleaning process, the method comprising:

exhausting the process chamber while supplying a cleaning gas into the process chamber, the cleaning gas consisting of O₂ gas and H₂ gas and an inactive gas or consisting of O₂ gas and H₂ gas into the process chamber with a ratio of the H₂ gas relative to the O₂ gas set at 2 or more; and

generating plasma of the cleaning gas inside the process chamber;[[],] thereby performing cleaning inside the process chamber, without setting the process chamber opened to the atmosphere after the process

applying the plasma to the tungsten oxide to sublime the tungsten oxide; and removing the sublimated tungsten oxide thus generated from inside the process chamber along with gas being exhausted.

Claims 14-15 (Canceled).

Claim 16 (Currently Amended): The process chamber cleaning method according to claim 13, wherein each of plasma used in the plasma oxidization process and and the plasma of the cleaning gas is cleaning are performed by plasma generated by microwaves supplied into the process chamber through a planar antenna having a plurality of slots.

Claims 17-20 (Canceled).

Claim 21 (Previously Presented): The process chamber cleaning method according to claim 13, wherein the cleaning gas has a ratio of H₂ gas relative to O₂ gas set at 4 or more.

Claim 22 (Canceled).

Claim 23 (Currently Amended): The process chamber cleaning method according to claim 13, wherein the cleaning process is performed while temperature inside the process chamber is set to be about 400 to 800°C.

Claim 24 (Currently Amended): The process chamber cleaning method according to claim 13, wherein the cleaning process is performed while pressure inside the process chamber is set to be less than 126 Pa.

Claims 25-28 (Canceled).

Claim 29 (Currently Amended): A substrate processing method comprising:
performing a plasma oxidation oxidization process on a first substrate having a first laminated film including a first tungsten-containing film and a first poly-silicon film to selectively oxidize the first poly-silicon film inside a process chamber [[in]] of a substrate processing apparatus;

exhausting performing a cleaning process inside the process chamber without the first substrate placed therein while exhausting gas from inside the process to remove tungsten oxide with which the process chamber is contaminated, the cleaning process being started without setting the process chamber opened to the atmosphere after the plasma oxidization process, the cleaning process including,

~~while supplying a cleaning gas into the process chamber, the cleaning gas consisting of O₂ gas and H₂ gas and an inactive gas or consisting of O₂ gas and H₂ gas into the process chamber with a ratio of the H₂ gas relative to the O₂ gas set at 2 or more, and generating plasma of the cleaning gas inside the process chamber, thereby performing cleaning inside to clean the process chamber, without setting the process chamber opened to the atmosphere after the plasma oxidation process; and applying the plasma to the tungsten oxide to sublimate the tungsten oxide, and removing the sublimated tungsten oxide thus generated from inside the process chamber along with gas being exhausted; and~~

~~performing [[a]] the plasma oxidation process on a second substrate having a second laminated film including a second tungsten-containing film and a second poly-silicon film to selectively oxidize the second poly-silicon film inside the process chamber after the cleaning process.~~

Claims 30-40 (Canceled).

Claim 41 (Currently Amended): The substrate processing method according to claim 29, wherein each of plasma used in the plasma oxidation oxidization process and the plasma of the cleaning gas is cleaning are performed by plasma generated by an inductive coupling type, plasma generated by a parallel-plate type, plasma generated by a planar antenna type, reflection wave plasma, or magnetron plasma.

Claim 42 (Currently Amended): The substrate processing method according to claim 29, wherein each of plasma used in the plasma oxidation oxidization process and the plasma

~~of the cleaning gas is cleaning are performed by plasma generated by microwaves supplied into the process chamber through a planar antenna having a plurality of slots.~~

Claims 43-54 (Canceled).

Claim 55 (Previously Presented): The substrate processing method according to claim 29, wherein the cleaning gas has a ratio of H₂ gas relative to O₂ gas set at 4 or more.

Claim 56 (Currently Amended): The substrate processing method according to claim 29, ~~further comprising the method further comprises~~ seasoning the process chamber under the same conditions ~~as the plasma oxidization process after the cleaning process and before the plasma oxidization process on the second substrate cleaning, prior to the plasma process.~~

Claim 57 (New): The process chamber cleaning method according to claim 1, wherein the cleaning process is performed while pressure inside the process chamber is set to be less than 126 Pa.

Claim 58 (New): The substrate processing method according to claim 29, wherein the cleaning process is performed while pressure inside the process chamber is set to be less than 126 Pa.

Claim 59 (New): The process chamber cleaning method according to claim 1, wherein the cleaning process is performed while temperature inside the process chamber is set to be about 400 to 800°C.

Claim 60 (New): The substrate processing method according to claim 29, wherein the cleaning process is performed while temperature inside the process chamber is set to be about 400 to 800°C.

Claim 61 (New): The process chamber cleaning method according to claim 1, wherein the cleaning gas is supplied while the O₂ gas is set at a flow rate of 10 to 500 mL/min and the H₂ gas is set at a flow rate of 40 to 2,000 mL/min.

Claim 62 (New): The process chamber cleaning method according to claim 13, wherein the cleaning gas is supplied while the O₂ gas is set at a flow rate of 10 to 500 mL/min and the H₂ gas is set at a flow rate of 40 to 2,000 mL/min.

Claim 63 (New): The substrate processing method according to claim 29, wherein the cleaning gas is supplied while the O₂ gas is set at a flow rate of 10 to 500 mL/min and the H₂ gas is set at a flow rate of 40 to 2,000 mL/min.

Claim 64 (New): The process chamber cleaning method according to claim 61, wherein the cleaning gas is supplied while the inactive gas consisting of Ar is set at a flow rate of 200 to 2000 mL/min.

Claim 65 (New): The process chamber cleaning method according to claim 62, wherein the cleaning gas is supplied while the inactive gas consisting of Ar is set at a flow rate of 200 to 2000 mL/min.

Claim 66 (New): The substrate processing method according to claim 63, wherein the cleaning gas is supplied while the inactive gas consisting of Ar is set at a flow rate of 200 to 2000 mL/min.